

Actively Cooled Ceramic Composite Nozzle Material, Phase I

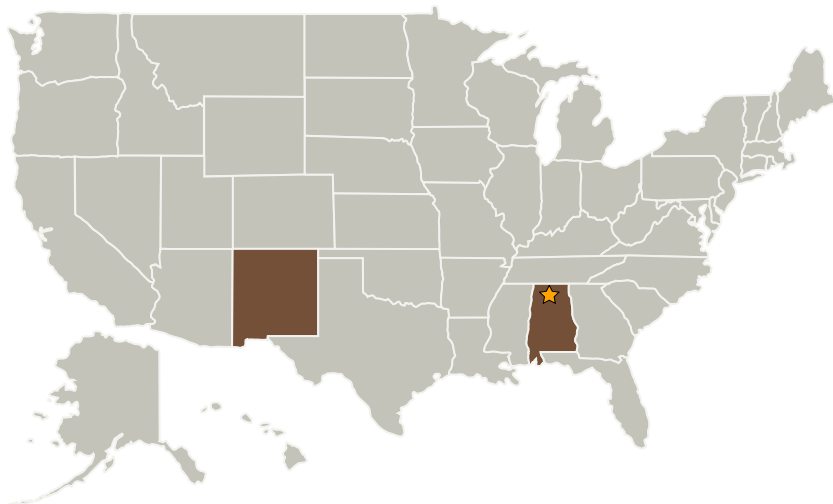
Completed Technology Project (2004 - 2004)



Project Introduction

For Next Generation Launch Vehicles (NGLV), Either a Rocket-based or Turbine-based Combined Cycle (RBCC or TBCC) engine will power the Next Generation Launch Vehicle (NGLV). Both TBCC and RBCC engines include operation as a scramjet. The RBCC and TBCC environments are exceedingly hostile, and actively cooled components are likely to play critical roles in both engines. The development of actively cooled fiber-reinforced ceramic (FRC) composites for combined cycle engines has the potential to increase performance and reduce component cost by replacing exotic metals, such as rhenium. Unfortunately, effective methods of processing FRCs are lacking, and active cooling strategies cumbersome. In addition, reliable methods of inspecting FRC components after manufacture and following assembly are needed. Thor Technologies, Inc. will team with Los Alamos National Laboratory (LANL) and an engine company to validate an innovative process that produces novel hybrid metal/FRC composite materials suitable for use in combined cycle engines, with the goal of developing an actively cooled FRC nozzle. In addition, Thor Technologies will work with another small business to refine non-destructive evaluation (NDE) methods with the potential for assuring the quality of hybrid metal/FRC composites as manufactured and following assembly.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Thor Technologies, Inc.	Supporting Organization	Industry	Albuquerque, New Mexico

Primary U.S. Work Locations

Alabama	New Mexico
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Stuart Schwab

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.3 Cryogenic